

which time about 5,000 tons of sugar are produced of No. 1 quality with an average polarization of 97.4.

Sugar is sent from the mill to warehouse over an incline tramway extending from the mill to the landing platform, from which point an 800-foot wire cable is attached to the steamer lying off shore. A hoisting engine built by the Honolulu Iron Works is installed at the landing and it is remarkable the amount of sugar that can be transmitted over this cable and into the steamer's hold in a brief time.

The company has erected a spacious new

store and general office at Honomu, which compares most favorably with any in the Hilo district.

William Pullar has been manager of the Honomu Sugar Company for the past ten years.

Following are the employees: Head Overseer, Alexander Mitchell; Chief Mill Engineer, A. W. Dunn; Bookkeeper, D. G. Butchart; Timekeeper, M. Rycroft; Sugar Boiler and Chemist, H. D. Beveridge; Store Manager, William Hay; Carpenter, Manuel M. Jordao; Physician, Dr. Archer Irwin.

Honolulu Agents, C. Brewer & Co., Ltd.

HAKALAU PLANTATION COMPANY, LTD.

THE property of the Hakalau Plantation Company is in the Hilo district, about fifteen miles from the town of Hilo. The plantation embraces 26,600 acres, 6,000 of which is planted to several varieties of cane. The Yellow Caledonia predominates.

The plantation maintains ten miles of main and lateral V flumes through which the cane is conveyed to the mill and delivered direct to the twelve-roller mill, operated by steam power and with a capacity of seventy-five tons of raw sugar in twenty-four hours. The company operate their own electric light plant, driven by a 24-inch Pelton water wheel, which furnishes light to the mill, store, manager's house, etc. The mill is located in a picturesque spot at the bottom of Hakalau Gulch close by the sea, a sea-wall built of cement and stone, surrounding it upon the ocean side.

The sugar, when sacked and ready for shipment, is hauled up over a steep incline tramway to the landing warehouse, where it is shipped on board the Inter-Island steamers by a wire cable arrangement from warehouse to the deck of the steamers, without damage or breakage.

The grinding season at Hakalau usually lasts about six months. The average yield of sugar to the acre is about 3½ tons. The total output of the mill during 1908 was 12,832 tons. The estimate for 1909 is 11,000 tons.

changes. The sugar is dropped from the centrifugals to the floor of the sugar room whence it is elevated into two large bins, and there it is allowed to cool before being bagged.

The various cane fields are intersected by good roads. Plowing is done with Secretary disc and ordinary moldboard plows drawn by mules, while the cultivation is carried out by Deere disc bedders, Crescent disc cultivators, Horner ratoon plows and Horner cultivators, the Horner patents proving highly satisfactory.

The soil is fertilized with 1000 pounds of high grade fertilizer and 1800 pounds of lime to the acre.

The company maintains a large number of stock upon its property, there being 210 mules and 41 horses in use.

Percentage of Working Laborers.

There are over 1200 laborers on Hakalau plantation, 38 skilled; 51 Portuguese, 800 Japanese, 83 Japanese Women, 60 Porto Ricans, 30 Spanish and Porto Rican Women, 144 Chinese, 4 Hawaiians, 39 Koreans and 26 Spaniards. Nearly all the work is performed under the day labor system.

The machine shops are at the mill, while at Hakalau proper are the spacious plantation stables, carpenter and blacksmith shops and the large general merchandise store run in connection with the postoffice and plantation offices.

The blacksmith shop has been recently

kept busy while the steamer lies but a short distance off shore.

John M. Ross, who has been connected with the Hakalau Plantation Co. for fifteen years, has been its manager since September 1st, 1905.

The names of others holding responsible positions upon the plantation follow:

Head Overseer, Alex. Smith; Chief Mill Engineer, Robert Sadler; Bookkeeper, Jas. M. Muir; Assistant Bookkeeper, John Fraser; Timekeeper, J. M. Jamie; Sugar Boiler and Chemist, Charles Reinhardt; Store Manager, Wm. Ross; Physician, Dr. Archer Irwin.

Officers of the Company:

President, John A. Buck.

Vice-President, A. B. Spreckels.

Treasurer, N. Ohlandt.

Secretary, H. W. Thomas.

Auditor, D. G. May.

Directors, John A. Buck, N. Ohlandt, F. Tillmann Jr., John D. Spreckels and A. B. Spreckels.

Honolulu Agents, Wm. G. Irwin & Company, Ltd.

KUKAIAU MILL COMPANY

ALL sugar cane taken from the lands of the Kukaiau Plantation Company is ground in the mill of the Kukaiau Mill Company, situated upon the lands of the Kukaiau plantation at Paauilo. The elevation at the mill is about 250 feet. The Mill Co., is a co-partnership business, one-half of which is held by The Kukaiau Plantation Co., Ltd., and the other half by Messrs. Theo. H. Davies & Co., which latter act as Agents for the Mill Company.

The sugar factory is a nine-roller mill operated by steam power obtained by burning bagasse, fed automatically to the furnaces, of the Dutch-oven-type. The machinery of the mill is admirably arranged, the equipment including Ross cane cutters, one 3-ton and one 7-ton vacuum pan, seven 30-inch Weston centrifugals, triple effect, juice heaters, ordinary clarifiers, etc. The first mill is 30x60, the second 30x54, and the third mill, which is 32x60, is of modern type, hav-

cooler, this water being used again for condensing purposes.

The average mill extraction is from 91 to 93 per cent. The mill is lighted throughout by twelve large Washington light system arc lights.

Sugar discharged from the centrifugals falls into a hopper and is elevated to the top of the boiling house, where it is bagged and slid down chutes to the sugar room. Sugar ready for the market is taken down to the landing, about 270 feet from the mill, by a double inclined tramway system. It is loaded into boats by the aid of the crane at the landing and taken to the steamer which conveys it to Honolulu.

E. Madden has been identified with the Kukaiau Mill Company for twenty-one years, the last nine years of which time he has been its manager.



The Mahogany Lumber Company's Mill at Pahoa, Hawaii, now at work on a big Ohia tie contract with the Santa Fe Railroad.

HAWAIIAN MAHOGANY LUMBER CO., LTD.

THE company was organized in June, 1906. The object was to manufacture and sell, Koa (Hawaiian Mahogany) lumber. Operations were commenced near the Volcano House, Island of Hawaii, in the forest of Keauhou, a temporary circular saw mill erected, and a few hundred thousand feet of Koa lumber cut.

The demand for hardwood ties for use by the great railroad systems on the mainland caused the company to turn its attention to the Ohia forests. Sample ties were sent forward and tested, and proved so satisfactory that the Atchison Topeka and Santa Fe Railway System entered into contract with this company for 2,500,000 cross ties, and 2,500 sets of switch ties. This quantity of ties was to be delivered in equal yearly installments, over a period of five years.

With this contract in hand all effort was directed to the erection of a saw mill at Pahoa, Puna, Hawaii, to fill this contract. A modern saw mill complete in every respect, with logging camps, stores, and about 5 miles of logging railroad has been completed in the last year, and the first cargo of ties were shipped to San Francisco on the bark "Emily F. Whitney" which left Hilo Dec. 1st, 1908.

Large quantities of ties for local consumption have also been disposed, during 1908. Some small shipments of Ohia lumber have also been made, and it is believed a large business in Ohia lumber will develop as soon as the lumber is put on the market commercially.

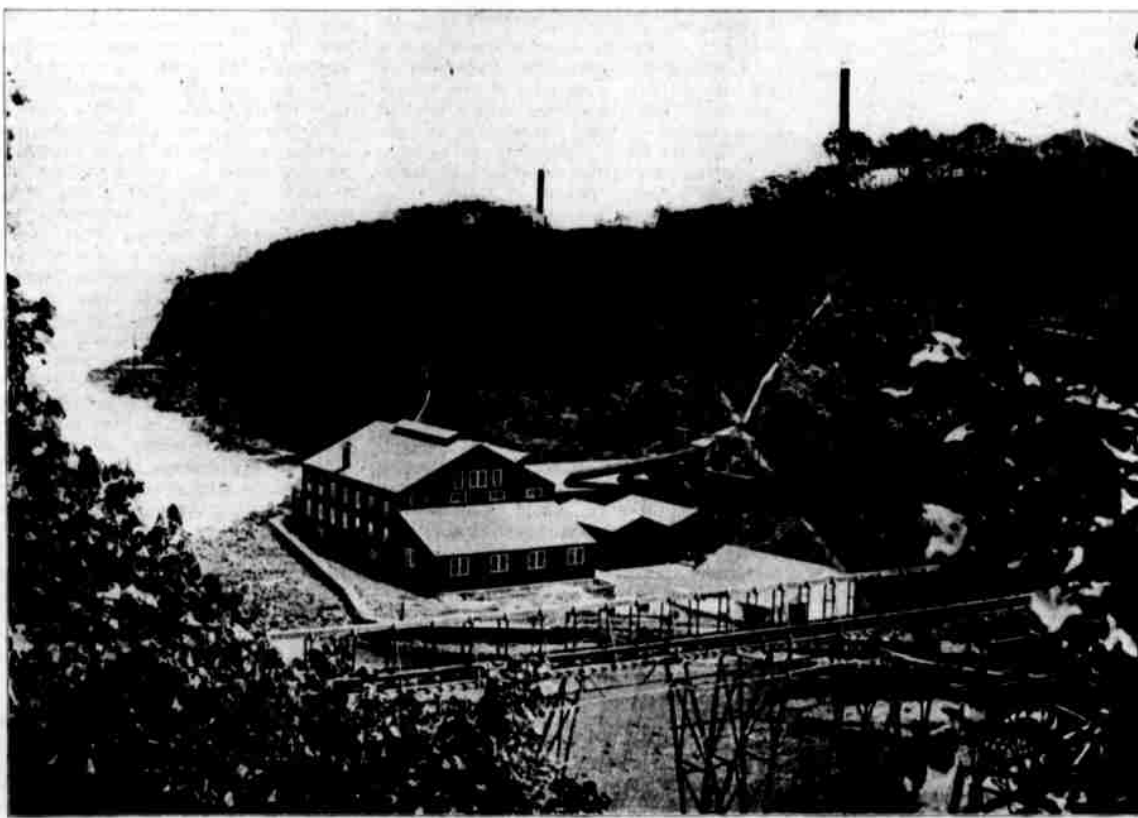
The operations at Pahoa, Puna, are now in such shape that the company has decided to again take up the manufacture of Koa lumber. Estimates are being obtained from leading saw mill manufacturers in the United States, for a band saw mill to be erected in the Keauhou forest near the Volcano House.

Connection by rail with the Hilo R. R. Co.'s line at Glenwood, will be made, enabling the company to handle its entire product from the mill to tidewater by rail. Koa lumber has been classed as a Mahogany on account of its fine texture and grain, and is much in demand by manufacturers of furniture and for interior finishing.

A veneering plant may also be installed for the manufacture of veneers, as the Koa is particularly suited for veneering.

The capital stock of the company is \$250,000.00.

The officers are: L. A. Thurston, President; A. N. Campbell, Vice-President; F. B. McStocker, Secretary and Treasurer; Audit Co. of Hawaii, Auditors; Samuel Johnson, Manager. Honolulu Agents, Hawaiian Development Co., Ltd.



Picturesque Mill of Hakalau.

The present mill, which is most complete, was erected by the company in 1897, the steel structural work being supplied by the Judson Manufacturing Company of San Francisco. The working plans were furnished by the Honolulu Iron Works.

Its Big Smokestack.
Because of the situation of the mill it was necessary to construct a brick flue surmounted by a smokestack 120 feet high and having an elevation 235 feet above the mill site. This tall smokestack gives the furnaces in the mill a better draught. The mill is quite complete in all its departments, being supplied with sixteen 30-inch centrifugals, two Standard triple effects, ten open clarifiers, two 8 and one 5-ton vacuum pans, besides much other machinery. The four 3-roller mills and Krajewski crusher are driven by two powerful Hamilton-Corliss engines while the centrifugals which make 1,300 revolutions per minute, are driven either by steam or water power. An immense twelve-ton overhead traveling crane is used in the mill for handling the ponderous machinery when making repairs or

augmented by the installation of band saws, a planer and circular saws, and is now thoroughly equipped to do any kind of repair work.

The manager's handsome and prettily located residence is just across the Government road from the store.

Honohina Division.

Upon the Honohina division of the plantation the company maintains carpenter and blacksmith shops and a branch store. Cane grown at Waikamalu is flumed in a branch flume to a point makai of Honohina, where it is taken up to Honohina in cars drawn by a stationary steam engine, and then dumped into the main flume and hurried to the mill.

A landing situated upon the bluffs makai of Honohina handles all freight for this division of the plantation. Freight landed here is taken from the boats and placed in the warehouse by a derrick and swinging boom propelled by a water wheel. Freight is taken from the warehouse up to Honohina in cars drawn by a stationary steam engine. Freight is handled quite rapidly at this landing as three steamers' boats are

ing been installed by the Honolulu Iron Works a few years ago.

One Heine boiler supplies steam to operate three independent engines which run the three 3-roller mills. No. 1 mill is run by a Putnam engine, No. 2 mill by a Harris-Corliss engine, while a large Hamilton-Corliss engine runs the third and largest mill. Power for running the boiling house is generated by two sets of tandem boilers, each set containing one multitubular and one Cornish boiler.

The capacity of the mill is about twenty tons of sugar in twelve hours, the cane ground being all supplied exclusively by the Kukaiau Plantation Company. The Horner system of aerial transmission is used in landing the cane at the mill. During the grinding season about fifty men are employed in the mill at day labor rates.

The sugar output for 1908 was 3567 tons. The estimate for 1909 is about 3600 tons.

The juice from the mill is run through a juice heater, heated by exhaust steam from the engines. The condensed water from the triple effect is cooled by means of a Bush